

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A method of manufacture of a vehicle mounted rotary concrete mixing drum of the type having an opening at one end for receiving and/or discharge of concrete therefrom and at the other end, means for engaging a drive assembly so as to rotate the drum for mixing or discharging concrete; wherein, the drum is manufactured from at least one mould using at least one plastics material; wherein the drum further includes integrally attached vanes which outstand from the internal surface of the drum forming an archimedian spiral disposed such that when the drum is rotated in a first direction, the concrete contents are mixed and when the drum is rotated in a second direction the contents are discharged from said drum; wherein, the method comprises the steps of ;
- a) preparing a first generally helical inner mold part;
  - b) mounting the first helical inner mould part on a support
  - c) enclosing the inner helical mold assembly within an outer mould formed by at least one outer mold part;
  - d) fitting a second mating inner helical mold part to the first inner mould part to form an inner mold assembly;
  - e) injecting a polyurethane elastomer into a cavity defined by said inner mold assembly and the outer mould assembly to form an inner wall element comprising one half of an interior wall of the mixer and one helical blade;
  - f) allowing said polyurethane to cure;
  - g) removing said at least one outer mold parts to expose said inner wall element;
  - h) removing said inner wall element one of said inner molds;
2. A method according to claim 1 comprising the additional step of placing a reinforcing member in a recess formed in said inner mold part.
3. A method according to claim 2, wherein steps a) – h) are repeated thereby providing a second helical inner wall element.

4. A method according to claim 3 wherein the first and second helical inner wall elements are complimentary and combine to form an inner wall surface of the mixing drum.
5. A method according to claim 4 comprising the further step of placing said first and second helical inner wall elements into a jig where opposing edges of said elements are held adjacent; the wall elements defining an inner cavity of said drum.
6. A method according to claim 5 wherein said opposing edges are sealed to complete said inner wall of said drum.
7. A method according to claim 6 comprising the further step of removing said inner wall from said jig and placing said inner wall on a mandrel such that the mandrel is disposed in said inner cavity.
8. A method according to claim 7 wherein the inner wall is placed on said mandrel via an open end of said inner wall
9. A method according to claim 8 comprising the further step of applying structural layers of glass fibre reinforced plastic to the polyurethane inner layer.
10. A method according to claim 9 wherein the internal surface of the drum includes an elastomer which allows mixing of the contents of the concrete at a concrete boundary layer;
11. A method according to claim 10 wherein said reinforcing member is a continuous rope inserted in a recess in said blades.
12. A method of construction of a plastics concrete mixing drum wherein the method includes the use of inner and outer molds each made up from separate mould parts which are divided along two helical lines thereby allowing formation of a drum interior wall from two complementary mould parts.

13. A method of manufacture of a vehicle mounted rotary concrete mixing drum of the type having an opening at one end for receiving and discharge of concrete therefrom and at the other end means for engaging a drive assembly so as to rotate the drum for mixing or discharging concrete; wherein, the drum is manufactured from at least one inner mould and at least one opposing outer mould; wherein the drum includes integrally attached vanes which outstand from the internal surface of the drum forming an archimedian spiral disposed such that when the drum is rotated in a first direction, the concrete contents are mixed and when the drum is rotated in a second direction the contents are discharged from said drum; and wherein the internal surface of the drum is formed or lined with an elastomer which causes mixing of the contents of the concrete at the concrete boundary layer; wherein the method comprises the steps of;
- a) preparing a first inner helical mold containing a surface intermediate side edges of the mould;
  - b) placing a reinforcing rod in a recess in said inner mold;
  - c) enclosing the inner helical mold assembly within at least one outer mold part;
  - d) sealing a joint between said inner mold part and said at least one outer mold part;
  - e) injecting a polyurethane elastomer into a cavity defined by said inner mold and said at least one outer mold part to form an inner helical wall element comprising one half of an interior of the mixer and one helical blade;
  - g) allowing said polyurethane to cure;
  - h) removing said at least one outer mold parts;
  - i) removing one of said inner molds;
  - j) removing the interior polyurethane inner helical wall element molding from the remainder of the inner mold assembly;
  - k) repeating steps a) – j) to form a second inner wall element.

14. A method according to claim 13 comprising the further steps of :

a) placing a second inner wall element along with said first inner helical wall element in a jig where the jointing surfaces are held adjacent so as to form an inner wall;

b) sealing the join formed by said jointing surfaces.

5            15.    A method according to claim 14 wherein comprising the additional step of

a) inserting a mandrel into an open discharge end of a drum interior ;

10            b) winding structural layers of glass fibre reinforced plastic about an outer surface of said inner wall.

16.    A method of construction of a plastics mixing drum comprising the steps of:

15            a) preparing a first inner mold containing a surface extending from a joint line midway between two helical blades to a mid line mould joint line at an inner edge of said blades;

b) placing a reinforcing rod in a recess in said inner mold;

c) fitting a second mating inner helical mold to form an inner mold assembly;

20            d) enclosing the inner helical mold assembly within at least one outer mold part;

e) sealing a joint between said inner mold assembly and said at least one outer mold part;

25            injecting a polyurethane elastomer into a cavity defined by said inner mold assembly and said at least one outer mold part to form one half of the interior of the mixer and one of the helical blades;

f) allowing said polyurethane to cure;

g) removing said at least one outer mold parts;

h) removing one of said inner molds;

30            i) removing the interior polyurethane molding from the remainder of the inner mold assembly;

- j) placing said two helical blade and interior moldings in a jig where the jointing surfaces are held adjacent;
- k) inserting a mandrel into an open discharge end of the drum;
- l) applying structural layers of glass fibre reinforced plastic the polyurethane layer.

17. A method according to any of the foregoing claims wherein the reinforcing is fitted with spacers which centralize the rod in its recess.

18. A method according to claim 17 wherein, the first and second inner helical mold elements are jointed with a sealing compound or gaskets along an inner edge.

19. A method according to claim 17 wherein the outer mold is formed in three separate mold parts.

20. A method according to claim 19 wherein, the joint between said two inner helical elements forming a helical blade is made with a polyurethane elastomer compound.

21. A method of manufacture of a vehicle mounted concrete mixing drum comprising the steps of;

- a) taking a helical inner mould part and mounting the mould on a support;
- b) placing at least one external mould in opposing relationship to said inner mould;
- c) injecting a flowable material into a space formed between said inner mould and said outer mould such that the flowable material forms a helical element which will form at least part of an inner surface of said drum;
- d) removing the at least one outer mould;
- e) removing the helical element from said inner mould;
- f) repeating steps a) - e) so as to form a second helical element;

g) preparing an exterior surface of the helical elements for bonding to a structural layer of glass fibre.

22. A method according to claim 21 wherein the flowable material is polyurethane.

5 23. A method according to claim 22 wherein, said first and second helical elements are joined in a jig to form an inner surface of said drum.

24. A method according to claim 23 comprising the further step of preparing an exterior surface of the mixer for bonding to a structural layer of glass fibre.

10 25. A method according to claim 24 comprising the additional step of winding a structural layer of fiberglass about said exterior surface.

26. A vehicle mounted rotary concrete mixing drum of the type having an opening at one end for receiving and/or discharge of concrete therefrom and at the other end, means for engaging a drive assembly so as to rotate the drum for mixing or  
15 discharging concrete; wherein, the drum is manufactured from at least one mould using at least one plastics material; wherein the drum further includes integrally attached vanes which outstand from the internal surface of the drum forming an archimedian spiral disposed such that when the drum is rotated in a first direction, the concrete contents are mixed and when the drum is rotated in a second direction the  
20 contents are discharged from said drum; wherein, the drum is formed by a method comprising the steps of ;

a) preparing a first generally helical inner mold part containing a surface extending between first and second helical edges;

b) mounting the first helical inner mould part on a support

25 c) enclosing the inner helical mold assembly within an outer mould formed by at least one outer mold part;

d) fitting a second mating inner helical mold part to the first inner mould part to form an inner mold assembly;

e) injecting a polyurethane elastomer into a cavity defined by said inner mold assembly and the outer mould assembly to form an inner wall element comprising one half of an interior wall of the mixer and one helical blade;

f) allowing said polyurethane to cure;

5 g) removing said at least one outer mold parts to expose said inner wall element;

h) removing said inner wall element one of said inner molds;

27. A vehicle mounted concrete mixing drum formed by a method of manufacture comprising the steps of;

10 a) taking a helical inner mould part and mounting the mould on a support;

b) placing at least one external mould in opposing relationship to said inner mould;

15 c) injecting a flowable material into a space formed between said inner mould and said outer mould such that the flowable material forms a helical element which will form at least part of an inner surface of said drum;

d) removing the at least one outer mould;

e) removing the helical element from said inner mould;

f) repeating steps a) - e) so as to form a second helical element;

20 g) preparing an exterior surface of the helical elements for bonding to a structural layer of glass fibre.

28. A concrete mixing drum according to claim 27 wherein the flowable material is polyurethane.

29. A concrete mixing drum according to claim 27 wherein helical blades  
25 projecting from an inner surface of said drum have a pitch dimension of between 1 - 2 meters and are formed by elastomeric material.

30. A mixing drum according to claim 28 wherein the wall strength of said drum is around 600MPa at a wall thickness of 8mm.

31. A mixing drum according to claim 29 wherein the polyurethane forms an inner layer which is approximately 3mm thick.
32. A mixing drum according to claim 31 wherein said structural layer comprises filament windings forming a layer of approximately 5mm thickness.
- 5 33. A method for making a concrete mixing drum, the method comprising: combining a first helical section and a second helical section.
34. A method for making a concrete mixing drum, the method comprising: providing a mould having a recess configured to form a drum blade; locating a reinforcing member in the recess; and  
10 inserting polymeric fluid in the recess such that the fluid flows about and substantially surrounds the reinforcing member.
35. A concrete mixing drum comprising:  
a first helical element; and  
a second helical element joined to the first helical element, wherein the  
15 first helical element and the second helical element form a substantially continuous layer circumferentially extending about a longitudinal axis of the drum.
36. The drum of claim 35 wherein the first helical element and the second helical element are polymeric.
37. The drum of claim 35 wherein the first helical element includes a  
20 blade.
38. The drum of claim 37 wherein the second helical element includes a blade.
39. The drum of claim 37 wherein the blade is helical.
40. The drum of claim 37 including a reinforcing member within a tip of  
25 the blade.



41. The drum of claim 35 including a second substantially continuous layer extending across a junction of the first element and the second element.

42. The drum of claim 41 wherein the second continuous layer is a fibre reinforced elastomer.

5        43. The drum of claim 35 wherein the first helical element and the second helical element form an interior of the drum.

44. An element comprising:  
a helical polymeric shell; and  
a polymeric blade integrally formed with and extending from the shell.